

REMARKS

This is in response to the Office Action dated May 19, 2005.

Claim 20 is objected to for formality reasons on page 2 of the Office Action, and is also rejected under Section 112, second paragraph. Claim 20 has been amended herein to address and resolve any potential issue in this respect. The pad electrode of claim 20 has proper antecedent basis in claim 19.

Claims 1-9 and 17-20 stand rejected under Section 103(a) as being allegedly unpatentable over Finnila. This Section 103(a) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires “a semiconductor substrate; a field oxide film formed on a surface of the semiconductor substrate, the field oxide film having an aperture section; *a pad electrode formed on the field oxide film*; and a penetration electrode electrically connected to the pad electrode via the aperture section of the field oxide film and via a hole formed in the semiconductor substrate, the hole in the semiconductor substrate being formed entirely within the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that an opening of the hole is smaller than the aperture section.”

The Office Action admits that Fig. 6 of Finnila fails to disclose a pad electrode formed on the field oxide film. It is noted that the structure of Fig. 6 is part of element 40 of Fig. 8, while bonding pads are provided on element 40 of Fig. 8. Therefore, the bonding pads of Fig. 8 are not provided on the field oxide film 13, since the alleged bonding pads are provided on a completely different substrate. Thus, Finnila fails to disclose or suggest a pad electrode formed on the field oxide film as required by claim 1.

Fig. 8 of Finnila relates to providing bonding pads when the 3d integrated circuit (element 40 of Fig. 8, which contains the structure of Fig. 6) is bumped to a larger diameter wafer (see col. 7, lines 7-16). There is no suggestion in Finnila to modify the bonding pads of Fig. 8 so as to be provided directly on the structure of Fig. 6.

The Office Action contends that one skilled in the art would be motivated to make such a modification by a desire to use the device in a practical application. However, there is no teaching or suggestion of such a motivation in the art of record. Indeed, the unmodified device of Finnila Fig. 8 is suitable and intended for practical application. Therefore, there is no reason why one of ordinary skill in the art would have modified the device of Finnila. Even if such a modification were attempted (which would be incorrect in any event), the bonding pads would be provided at the location of the metallization 21. Thus, the bonding pads would not be formed on the field oxide film as required by claim 1. Thus, even an alleged modification would fail to meet the invention of claim 1.

Claim 2 requires that the penetration electrode is formed in a *field area* of the surface of the semiconductor substrate. The Office Action contends that the right electrode of Finnila corresponds to the claimed penetration electrode. However, the right electrode of Finnila is in an active region, not in a field region or area (see col. 3, lines 45-55; and Figs. 3-6). Thus, Finnila fails to disclose or suggest that the penetration electrode is formed in a *field area* of the surface of the semiconductor substrate as required by claim 2.

Claim 3 requires that the pad electrode has an *aperture section*. Finnila fails to disclose or suggest this feature of claim 3.

Claim 4 requires that the aperture section of the field oxide film is formed in the aperture section of the pad electrode, when perpendicularly viewing the semiconductor substrate. Again, Finnila fails to disclose or suggest this feature of claim 4.

Claim 8 requires “a hole-filling section is formed in the hole, and the hole-filling section is made of an insulating material.” It is unclear where the Examiner contends these features are in Finnila. It is requested that the Examiner identify such features in the cited art, or withdraw the rejection of this claim.

Claim 18 requires “a *pad electrode formed on the field oxide film*; wherein: the penetration electrode is electrically connected to the pad electrode via the aperture section of the field oxide film and via a hole formed in the semiconductor substrate, the hole being formed entirely within the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that an opening of the hole is smaller than the aperture section; and the penetration electrode being formed in a *field area* of the surface of the semiconductor substrate.” Finnila fails to disclose or suggest these features of claim 18.

Claim 19 requires “a *pad electrode formed on the field oxide film*; wherein: the penetration electrode is electrically connected to the pad electrode via the aperture section of the field oxide film and via a hole formed in the semiconductor substrate, the hole being formed entirely within the aperture section of the field oxide film, when perpendicularly viewing the semiconductor substrate, so that an opening of the hole is smaller than the aperture section; and the *pad electrode having an aperture section*.” Finnila fails to disclose or suggest these features of claim 19.

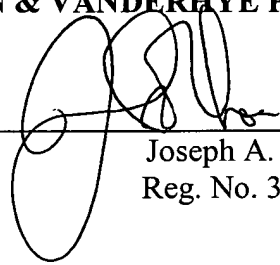
Claim 20 requires that "the aperture section of the field oxide film is *formed in the aperture section of the pad electrode*, when perpendicularly viewing the semiconductor substrate." Finnila fails to disclose or suggest these features of claim 20.

It is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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